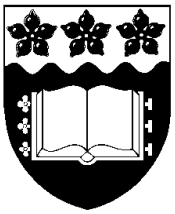

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WinEcon Fiscal Pathways: A Computer-Based Learning Module for the Subject Macroeconomic Theory and Policy

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WINECON FISCAL PATHWAYS

A Computer Based Learning Module for the Subject Macroeconomic Theory and Policy*

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FINALIST ASCILITE BEST SMALL PROJECT AWARD 1998

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* Some parts of this accompanying documentation relating to first year teaching includes details of joint work by members of the Department of Economics, University of Wollongong.

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Introduction:

There have been many national and international reports expressing concern about the problems of teaching economics subjects in universities and colleges. Statton and McBride (1995) regard the great diversity of students as a major problem. Stokes and Wilson (1998a, 1998b) detail the many changes occurring in the make-up of the student population in economics courses in Australian universities. Historically, the great majority of students who enrolled in economics were recent Higher School Certificate graduates who brought with them a common understanding of basic economics principles. This relative homogeneity allowed lecturers to plan subject content, and progression rates, through that content, with confidence. Now there is a growing heterogeneity amongst the candidature as a result of an increasing number of high school students who have no prior knowledge of economics and an increase in the number of students from overseas with some economics background, but with little knowledge of the Australian economy and institutions.

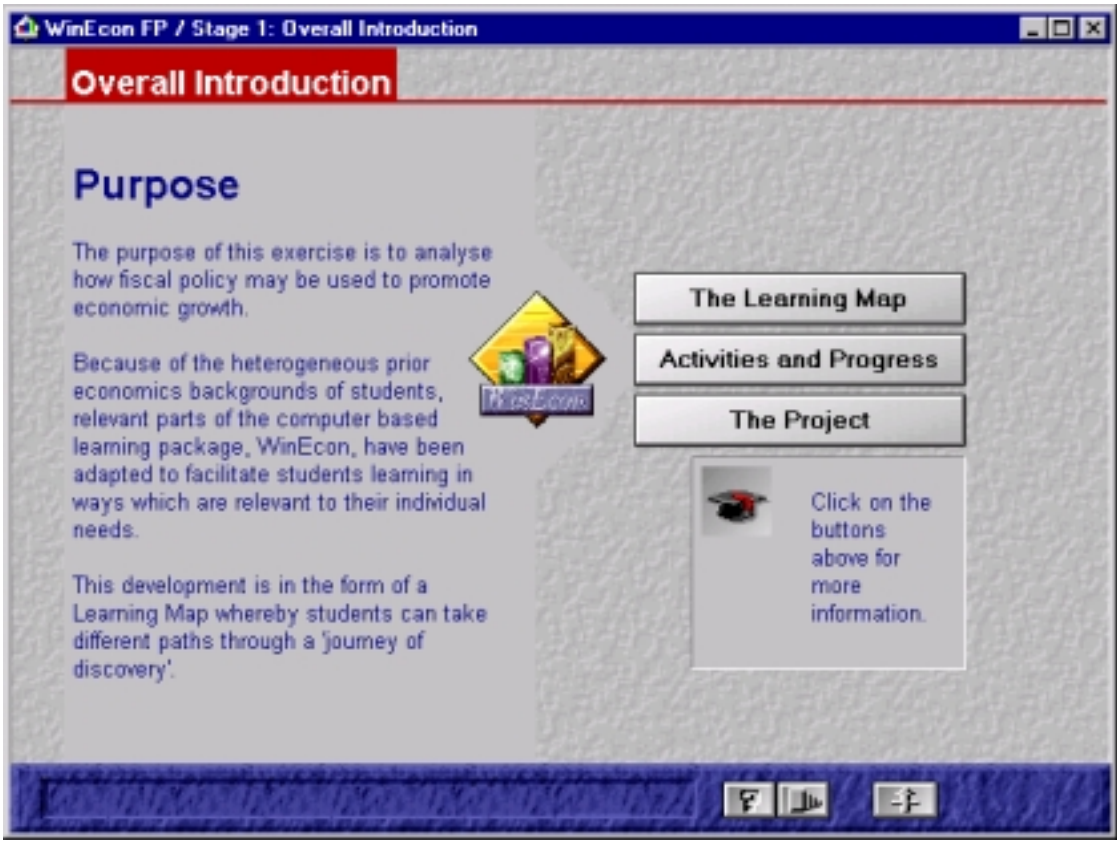
As a result, economics subjects are being taught to students who lack the basic building blocks of economics principles and who do not appreciate the broader application of economic analysis. According to Becker and Watts (1995) there have been many attempts to generate greater interest and enthusiasm in economics subjects over the last twenty five years. These mainly concentrated on using a variety of student centred teaching strategies.

Some Australian universities have addressed this problem by offering small group teaching in the larger economics subjects. The major initiatives here have been at the Universities of Adelaide, New South Wales and South Australia where changes were also made to the sequence and methodology of teaching. Whilst these approaches have merit, they are still based on the teaching of a common core of economics principles to all students irrespective of their prior economics knowledge or their personal interests and preferences. A number of national reports have emphasised the importance of considering students' prior economics knowledge and vocational requirements in post compulsory education and training (*vide* Finn, 1991, Mayer, 1992 and Carmichael, 1992). According to Lewis and Norris (1996), all university Economics Departments ought to "...thoroughly assess the content and structure of units in economics degree programmes and 'service units' with a view to matching them to student preferences".

Another consideration, as suggested by Fleming (1995) and St Hill (1997), is the preferred learning style of students. Students have different preferred styles of learning. Some students have a preference for visual ways of representing information. Some prefer to learn by aural methods. Others have a preference for reading and writing textual information, while others have a preference for kinesthetic learning experiences and practices.

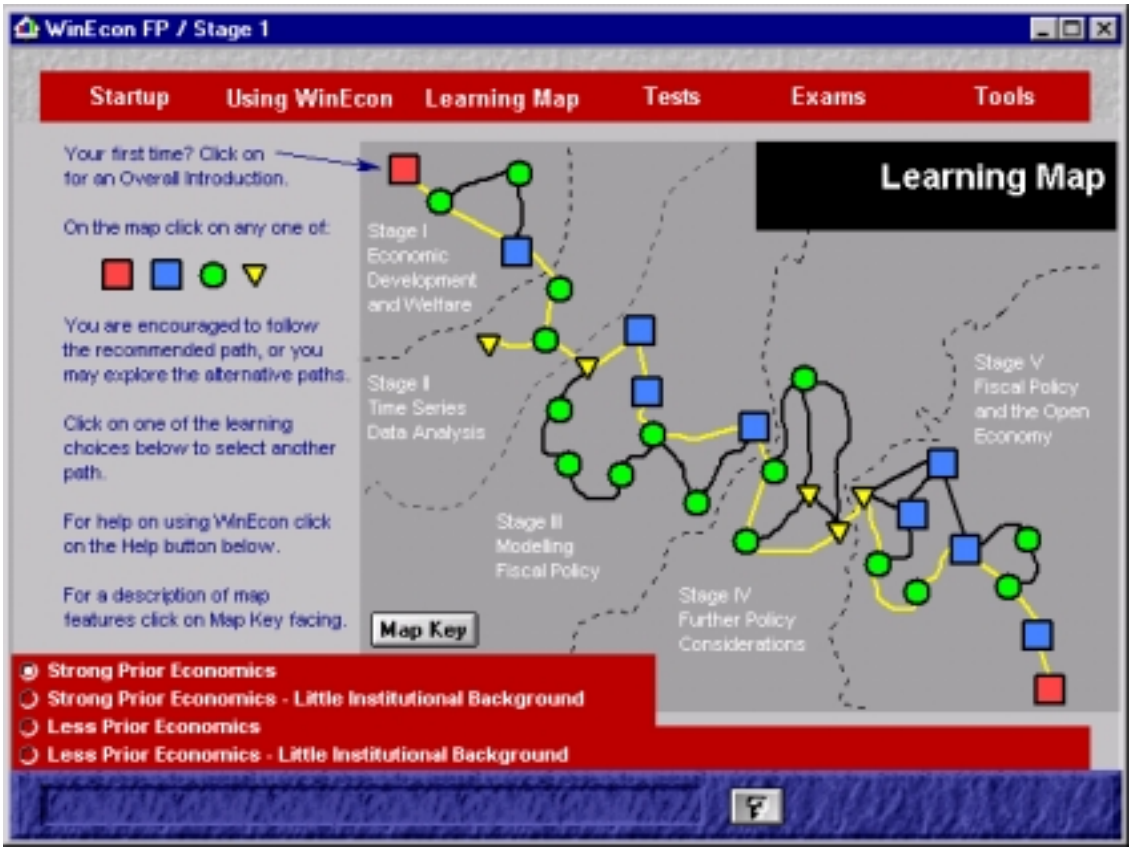
Alternate Learning Pathways:

One method that we have adopted to address these concerns is through a windows based computer assisted learning package. The package titled WinEcon Fiscal Pathways (FP) was designed to cater for students studying intermediate level Macroeconomic Theory and Policy. The module provides a 'journey of discovery' for these students as they explore a variety of learning experiences that provide a fuller appreciation and understanding of the implications of how fiscal policy may be used to promote economic growth in a global environment. This important topic was chosen as a basis for the computer based learning module as our experience showed that students are challenged both at conceptual and analytical levels in this part of the course. In addition, the differing backgrounds of student's prior economic and institutional knowledge can greatly influence their understanding of this topic. The package attempts to overcome these problems by offering students alternate learning pathways which are designed to better suit their prior learning backgrounds and needs. Students with the guidance of a learning map choose the pathway they feel is the most suitable for them. They are allowed to explore alternative routes and obtain feedback on their progress along each pathway. The following template is used as part of the introduction to the package.



WinEcon FP provides a journey of discovery for students as they explore a variety of learning experiences that will provide for them a fuller appreciation and understanding of the implications of fiscal policy. We do this by offering four alternate pathways to student learning. The pathways are based on two features of their prior learning backgrounds, namely their understanding of economic theory and principles and

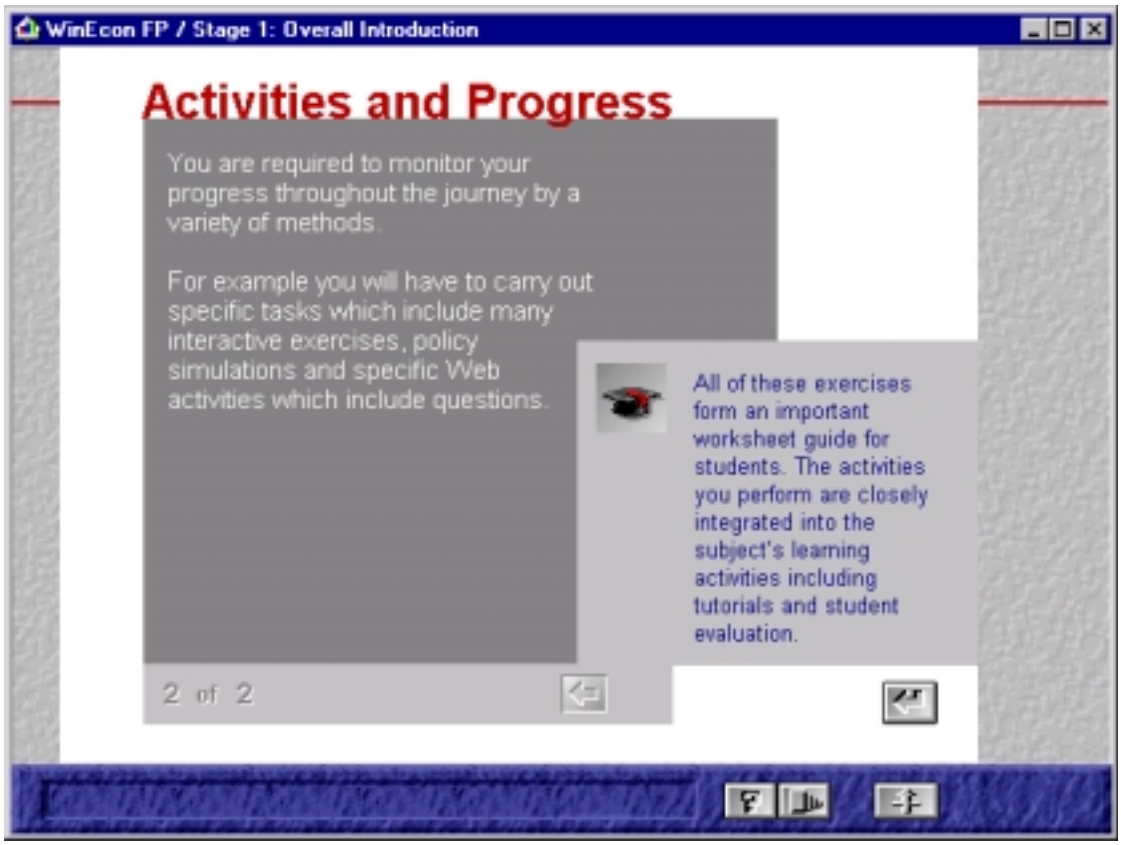
secondly their degree of understanding of relevant economic institutions. See the template on the next page.



The first pathway is designed for students with a strong understanding of economic theory and principles, and a good knowledge of economic institutions (Strong Economic and Institutional Background). The second pathway caters for students with strong prior economics but with little institutional knowledge (Strong Economic and Little Institutional Background). The third pathway is relevant for students who feel they have only a basic understanding of economics but a good understanding and knowledge of economic institutions (Basic Economic and Strong Institutional Background). The final pathway is designed for students with a basic understanding of economics and little institutional background (Basic Economic and Little Institutional Background).

Students, with the aid of a learning map, can choose the pathway that they feel is most suitable to their prior learning backgrounds and needs. If the pathway the student has chosen is not suitable, they may change to another pathway. At all times students are free to explore different activities, go anywhere on the learning map, travel in any direction, visit any location and stay as long as they wish. However the learning map has been designed to reduce the chance of students becoming lost, mistakenly bypassing important activities or becoming distracted so that their progress is slowed unnecessarily. Throughout the journey students obtain feedback and are required to monitor their progress according to their proficiency in conducting interactive exercises, Web exercises, policy simulations, answering questions, as well as submitting tutorial exercises and a project. Students also evaluate their progress by recording their learning

experiences in a diary. All of these activities form an important worksheet guide for students, which is closely integrated into the subject structure and content. See the example on the next page.



The journey includes common destinations that provide core information and learning activities that are relevant for all students. Important core concepts are dealt with along the alternate pathways in a manner appropriate to the needs and backgrounds of the students. For example, the analysis of the determinants of international trade and exchange rates at the beginning of Stage V can be approached in four different ways. Students with a basic level of economic understanding are led through the process of exchange rate determination using a transparent sequential process for fixed and flexible exchange rates and then a graphical derivation of the BP curve, which many students will still find challenging. Those with a strong understanding of economic theory and principles will analyse the international arbitraging of exchange rates, supply and demand analysis and derivation of the BP curve. This exercise requires a higher level of analysis and mathematical competency. Students from each of these two groups who wish to find out more about institutional trading patterns can decide to visit an interactive site that provides detailed information on international and regional trading patterns over time and for different sectors.

All of the learning activities have been grouped according to their complexity, relative size and expected average time required. The cities visited in the journey are by nature large and complex, offering a variety of learning experiences. On the other hand towns and villages offer only one or a few learning experiences. The journey of discovery is broken into the following five stages:

I	Economic development and welfare
II	Time series data analysis
III	Modelling fiscal policy
IV	Further policy considerations
V	Fiscal policy and the open economy

Each will be reviewed in terms of the desired key competencies we wish to achieve for each stage.

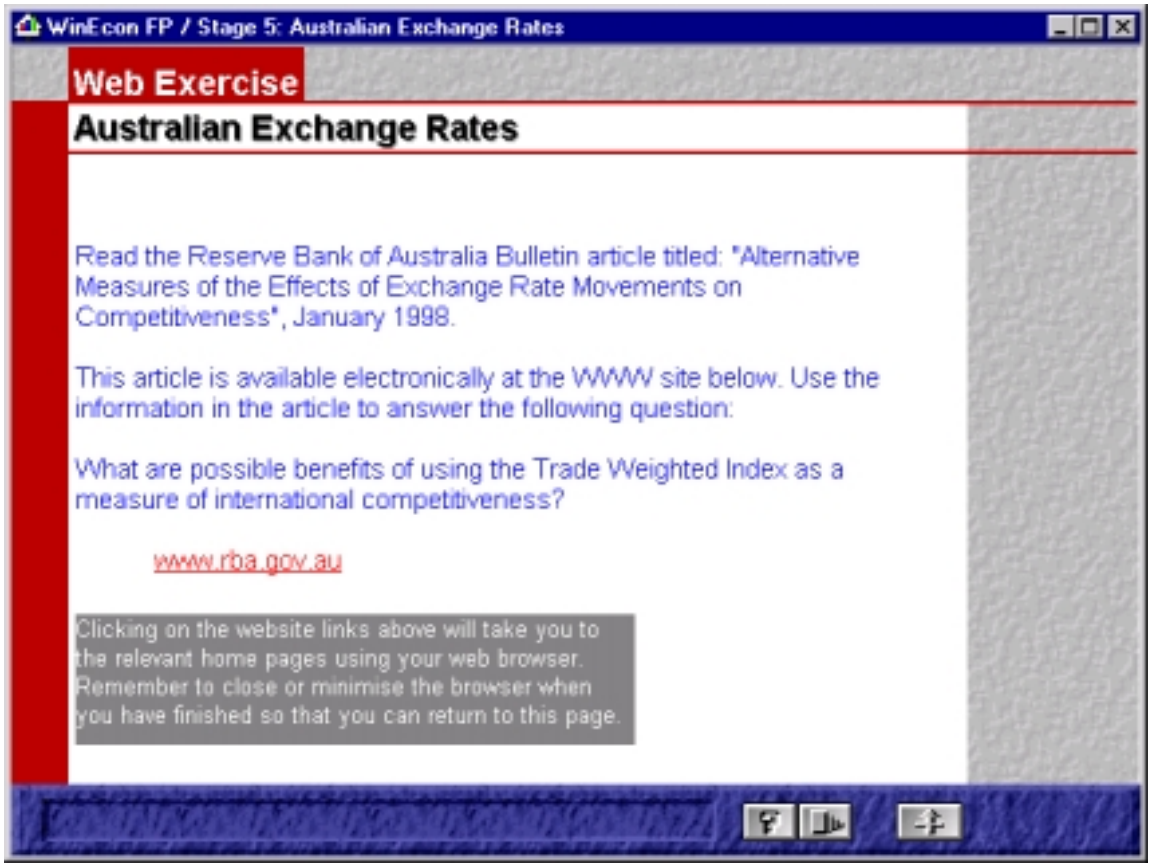
Competencies:

The Key Competencies are based on Mayer's (1992) review. The seven main categories of competencies are:

KC1	Collecting , analysing and organising information
KC2	Communicating ideas and information
KC3	Planning and organising activities
KC4	Working with others and in teams
KC5	Using mathematical ideas and techniques
KC6	Solving problems
KC7	Using technology

Stage I requires students to consider the difficulties in defining and measuring economic development and welfare. The purpose here is to introduce students to some advanced concepts, including the construction of a Human Development Index and an analysis and evaluation of its sensitivity to changes in component parts, for different countries (key competencies identified in Mayer (1992) are *KC1,5,6*). Students can search and analyse an international data base and optionally visit three institutional Web sites which include relevant exercises as per the example below (*KC1,3,6,7*). A tutorial discussion exercise is required to be submitted at the end of this stage (*KC1-4*). Stage II is designed to give students hands on experience in working with and analysing macroeconomic data using spreadsheet and formulas (*KC1,3,5-7*). This exercise is designed to complement the concepts, knowledge and skills students will have acquired in the first stage. The correlation analysis, detailed with appropriate exercises as an optional excursion, is used to determine pro and counter cyclical variables (*KC1,3,5-7*).

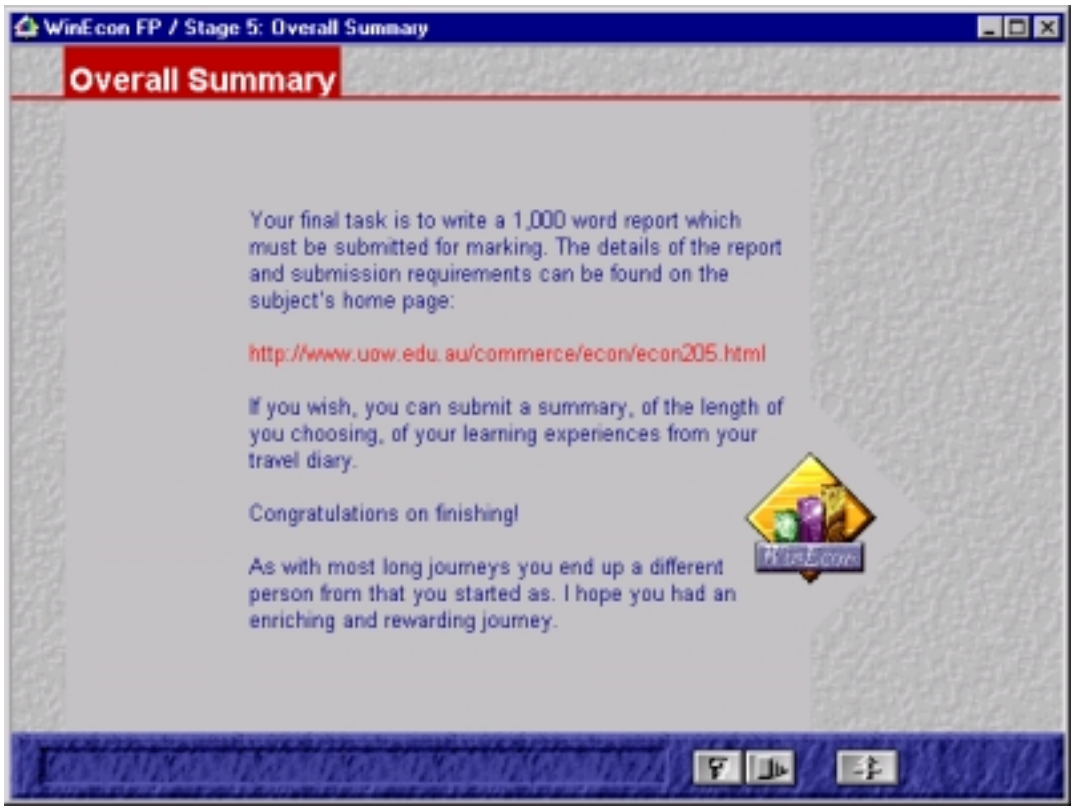
Having been introduced to the cyclical data, Stage III formally models how fiscal policy may affect output and its fluctuations. Some students may find parts of this theoretical section difficult in terms of analytic detail and economic concepts and principles. The closed economy IS LM model is therefore developed in alternate ways and students need to choose the pathway appropriate to their backgrounds and needs (*KC5,6*). Both paths cover the same core material. The paths then converge to cover common material which finishes with a challenging fiscal budget policy simulation exercise (*KC1,3,6,7*)**.** Students, who are unfamiliar with the Australian Treasury budget process, are advised to take the optional Web excursion to the Budget Papers and complete the assigned exercise. A tutorial discussion exercise is required to be submitted at the end of this stage (*KC1-4,7*).



Stage IV considers the complexities involved in using short run discretionary fiscal policy to stabilise the economy. The purpose of this section is to identify the difficulties in practice of judging the timing and magnitude of policy changes. As before, separate paths are recommended with both paths requiring students to vary parameters to simulate possible beneficial and harmful consequences of stabilisation policy (*KC1,5,6*). The final stage expands the IS LM model developed in Section III to an open economy model. Again, different paths are nominated which both consider the consequences of floating exchange rates and the Balance of Payments on fiscal policy. If students require institutional details on international trade then there is an optional excursion (*KC1*). The paths then converge to analyse the complete IS LM BP model with flexible exchange rates facing various exogenous shocks (*KC5,6*). A non trivial fiscal policy simulation exercise then follows (*KC1,3,6,7*). Students who require further institutional knowledge about exchange rates are advised to visit the Reserve Bank's web site, read the January Bulletin article and complete an exercise (*KC1,3,7*). At the completion of all five stages there is a final task which requires students to write and submit a 1,000 word report. Whilst not compulsory, students are also encouraged to submit a summary (of length of their choosing) on their learning experiences from their travel diaries (*KC1,2,3,6,7*).

In addition to these tasks, navigating WinEcon Fiscal Pathways and keeping a diary increases the overall competencies required of students to effectively plan the pathways they will take, set goals and priorities, manage time, evaluate their progress and effectively use the technology (*KC1,3,4,7*). It is important to note that the key competencies KC3, 4 and 7 feature throughout and are embedded in the learning activities of WinEcon Fiscal Pathways. This counters the observation in the 'Key Competencies Mapping Report' (1995) that whilst Years 11 and 12 economics courses have KC1, 2 and 5 as "embedded" and KC6 as "significant" there is "minimal"

representation of KC3, 4 and 7.



Expected Learning Outcomes:

It is intended that WinEcon Fiscal Pathways will greatly improve learning outcomes according to the 'Attributes of a Wollongong Graduate – Strategic Plan 1997-2005'. That is, graduates should, *inter alia*, have coherent and extensive knowledge in the economics discipline, be able to analyse critically, reason logically, solve problems and be willing to initiate and participate in change. The expected outcomes include that the students should:

- have a knowledge and understanding of the working of Australian fiscal policy;
- have an understanding of the important assumptions of the economic theories;
- demonstrate an understanding of the strengths and weaknesses of the relevant models as applied to the Australian and global economy;
- have an understanding of Australia's place and role in the global economies;
- be able to examine, interpret and apply written information and graphical and statistical data;
- be able to evaluate economic evidence used in support of economic arguments;
- be able to use economic tools to solve problems;
- reach conclusions that are based on economic reasoning; and
- be able to make informed and reasoned judgements about fiscal policy issues.

These outcomes are consistent with those requested by employers (*vide* University of Wollongong Employer Perception Surveys, 1992-94), including extensive knowledge in the chosen discipline, the ability to reason logically, the capacity to solve problems and more practical training.

Description of the Target Audience

The more recent expansion and internationalisation of the university sector has produced a student cohort of great diversity with respect to prior economics education. According to Hodgkinson and Perera (1996), 42% of first year economic students at the University of Wollongong in 1995 had no prior economics instruction, 43% had previous economics instruction at a secondary school in Australia and 15% had previous economics instruction elsewhere, mostly overseas.

At the start of each semester in 1998, full time first year macroeconomics students at the University of Wollongong were asked to nominate which of three categories best described their economics background. Of these students, 60% claimed they had "no prior economics knowledge", which is 18 percentage points higher than the Hodgkinson and Perera (1996) survey of all first year economics students. The proportion of students who nominated they had "studied economics in the Higher School Certificate (HSC)" was 20% which is less than half of the reported proportion of 43% of students who had "economics instruction at a secondary school in Australia". It would appear that there is a widening gap of economic knowledge between those who have studied economics for the HSC and those with no economics background. The proportion of this year's students who nominated "some economics background" was 20% which is slightly higher than the Hodgkinson and Perera (1996) finding. Evidence suggests that most of these students came from overseas (often having completed foundation studies courses in Australia) from technical and further education (TAFE) and students who had studied economics only in Year 11 at high school.

Table 1: Undergraduate Commencing Students in Business, Administration and Economics Fields of Study (Australia)

	% Share of Total Students								
	1989	1990	1991	1992	1993	1994	1995	1996	1997
Completed HSC[1]	57	56	52	50	51	51	47	45	46
Completed Higher Education Course	6	6	7	7	8	6	8	8	7
Incomplete Higher Education Course	10	11	12	12	11	12	13	13	14
TAFE[2]	4	5	6	6	7	10	11	10	13
Mature Age Entry	7	6	6	7	6	5	5	4	3
Other Special Entry	3	2	3	2	2	2	2	3	2
Other	13	14	14	16	15	14	14	17	15
No. Students ('000)	31	35	34	31	31	33	39	44	48

Notes: [1] or equivalent secondary school level in Australia.
[2] other than final year of secondary school.
Source: Department of Education Training and Youth Affairs, *Higher Education Student Data Collection*.

Enrolment data from the Department of Employment Education Training and Youth Affairs (summarised in Table 1) show that of the 48,079 students, commencing undergraduate studies in Business and Economics related fields in Australia during 1997, only 46% had completed the HSC compared to 57% in 1989. The remaining students included those who had studied for higher education courses (21%), those who had studied at TAFE (14%), special entry students (5%) and "other" students (15%). The main sources of "other" students admissions included relevant employment experience, professional qualifications and university set exams or assessments. The growth in the number of HSC entry students from 1989 to 1997 has been less than 20% compared to the total growth of 55%. Contrast this with the trebling in the share of students who have entered by TAFE from 4% to 13% during this period. Their total numbers rising over 420% in the period. It is also interesting to note the decline in percentage of mature age students from 7% of the cohort to only 3%.

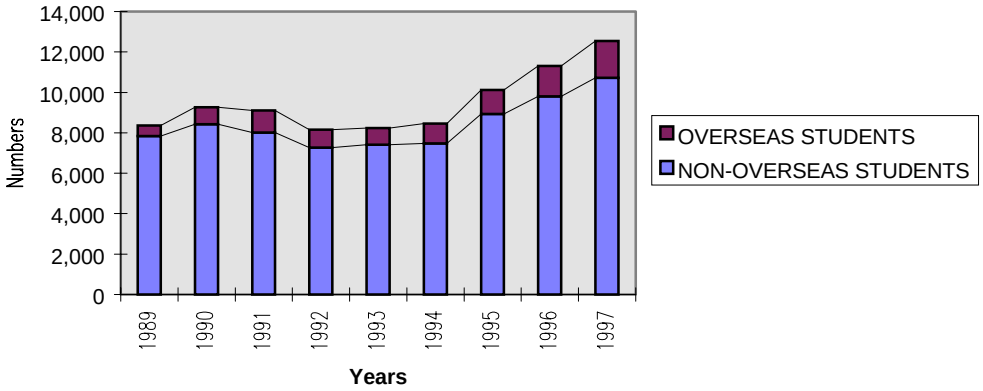
We believe the increasing diversity in students' backgrounds is significant and that this will have important implications for the structure and content of economics courses. Defining these students needs is no easy task and we attempt in this project to identify and analyse the differences in students backgrounds and needs. Because of the difficulty in obtaining appropriate data we consider this in terms of three categories: HSC students, overseas students, and TAFE/special entry students.

Overseas Students:

The number of overseas students commencing undergraduate studies in Business -Economics related fields, in Australia, has increased from 3,199 (10.3% of enrolments) in 1989 to 11,510 in 1997 (23.9% of enrolments) reflecting an average annual compound growth rate of around 17%. Figures 1 and 2 provide a comparison of the growth in overseas students in New South Wales and Australia as a whole. The growth in overseas students, while not as dramatic in New South Wales, is still significant with a rise from 6.2% of enrolling undergraduates to 14.6%.

Figure 1

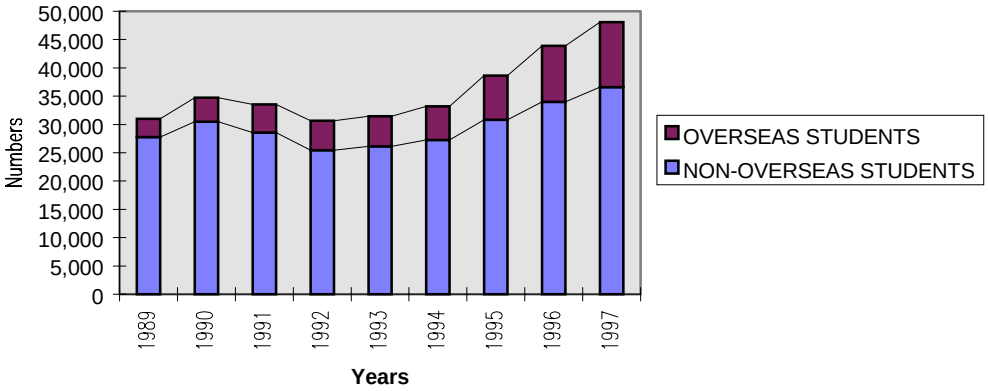
Undergraduate Commencing Students in Business Economics, etc (NSW only)



Source: Department of Education Training and Youth Affairs, *Higher Education Student Data Collection*.

Figure 2

Undergraduate Commencing Students in Business, Economics,etc (Australia)



Source: Department of Education Training and Youth Affairs, *Higher Education Student Data Collection*.

The relative importance of Australia in the growth in the international market for English speaking overseas higher education students is shown in Table 2. Australia's growth rate averaged nearly 12% per annum starting from a relatively low level in 1980 to increase by a factor of over seven until 1997.

Table 2: Overseas Higher Education Students by Destination Country

Destination Country	Number 1980	Number 1997	% of Total 1997	% Growth 1980-97[a]
USA	311,882	424,104*	62.4	1.9
UK	56,003	156,615*	23.0	6.2
Australia	8,777	64,188	9.4	11.7
Canada	28,443	30,695[+]	4.5	0.5
New Zealand	2,464	4,014	0.6	2.9
Total	407,569	679,616		3.1

Notes: [a] average annual growth rate for 1980-97.
* for 1996-97
[+] for 1995-96.
Sources: Industry Commission (1997), "Industry Submission to the Review of Higher Education Financing and Policy", Table A1.5 and Australian International Education Foundation (1998), "Overseas Student Statistics", Table 28, pp. 62-3.

It can be seen from Table 3, the Asian region is the major source of overseas students to the Australian higher education sector, accounting for 87% of all overseas higher education students in 1997. Of these 56,131 students from the Asian region, 75% totalling 41,315 students, were enrolled in undergraduate courses whilst the remaining 14,816 students were enrolled as postgraduates. Despite the large absolute numbers of Asian overseas students the growth rate averaged nearly 16 percent per annum over the period 1994 to 1997.

Historically, the majority of the Asian higher education students have come from four countries, Malaysia, Singapore, Hong Kong and Indonesia. These countries account for nearly three quarters of all Asian higher education students in 1997. Note from Table 4 that enrolments from all Asian countries are growing rapidly with the exception of Hong Kong and China.

Table 3: Overseas Higher Education Students by Source Region

Source Region	Number 1994	Number 1995	Number 1996	Number 1997	% of Total 1997	% Growth[a] 1994-97
Asia	34,861	40,835	46,948	56,131	87.4	15.9
Americas	1,249	1,927	1,887	2,124	3.3	17.7
Europe	1,034	1,265	1,468	1,913	3.0	20.5
Oceania	1,626	1,714	1,760	1,736	2.7	2.2
Africa	797	837	1,133	1,122	1.7	11.4
Other	1,677	1,256	1,119	1,162	1.8	-12.2
Total	41,244	47,834	54,315	64,188		14.7

Note: [a] average annual growth rate for 1994-97.
Source: Australian International Education Foundation (1998), "Overseas Student Statistics", Table 28, pp. 62-3.

Table 4: Overseas Higher Education Students by Asian Source Country

Source Country	Number 1994	1995	1996	1997	% of Total 1997	% Growth[a] 1994-97
Malaysia	7,751	9,161	11,056	12,810	22.8	16.7
Singapore	6,962	8,542	10,301	12,107	21.6	18.4
Hong Kong	7,987	8,392	7,616	9,674	17.2	6.4
Indonesia	3,053	3,995	4,855	6,051	10.8	22.8
India	802	1,249	1,910	2,367	4.2	36.1
Thailand	1,055	1,408	1,809	2,302	4.1	26.0
China	1,708	1,358	1,582	1,875	3.3	3.1
Taiwan	906	1,123	1,430	1,676	3.0	20.5
Korea (South)	861	1,002	1,157	1,470	2.6	17.8
Japan	931	1,103	1,276	1,449	2.6	14.7
Other	2,845	3,502	3,956	4,350	7.7	14.2
Total Asia	34,861	40,835	46,948	56,131		15.9

Note: [a] average annual growth rate for 1994-97.
Source: Australian International Education Foundation (1998), "Overseas Student Statistics", Table 28, pp. 62-3.

Indeed the importance of the provision of higher education services by Australia to the Asian region is clearly demonstrated by Australia's high international ranking as a destination from each of these Asian countries as shown in the final column of Table 5. We can also see from Table 5 that higher education enrolments in Australia by students from Malaysia, Singapore, Hong Kong and Indonesia totaled 40,642 in 1997 which was larger than both the 39,736 students who were studying in the USA and the 26,832 students enrolled in the UK.

Clearly Asian students are very important to Australia's overseas higher education sector and Australia is an important source of higher educational services to the region. It is therefore very important to design courses that will cater for these students backgrounds and needs.

Table 5: Numbers of Overseas Higher Education Students by Major Source and Destination Countries

	Destination Country					
Source Country	Australia 1997	United States 1996-97	United Kingdom 1996-97	Canada 1995-96	New Zealand 1997	Australia's Ranking
Malaysia	12,810	14,015	16,325	1,171	2,057	3
Singapore	12,107	3,575	4,736	599	172	1
Hong Kong	9,674	10,260	5,039	3,881	215	2
Indonesia	6,051	11,886	732	360	138	2
India	2,367	29,044	1,746	808	14	2
Thailand	2,302	12,179	1,804	149	167	2
China	1,875	40,492	1,776	1,839	44	2
Taiwan	1,676	27,824	2,365	500	135	3
Korea (South)	1,470	32,309	1,497	409	124	3
Japan	1,449	40,851	3,879	1,085	302	3
Other	12,407	201,669	116,716	19,894	646	4
Total	64,188	424,104	156,615	30,695	4,014	

Source: Australian International Education Foundation (1998), "Overseas Student Statistics", Table 42, pp. 88.

This issue is important for many Australian universities especially the main universities who cater to international students. Table 6 lists the ten universities with the largest overseas student enrolments by internal mode of attendance whilst Table 7 details the top five Australian universities by external and multi modal attendance. Referring to Table 6, the ten universities with the largest overseas enrollments by internal mode have 31,603 overseas students which represent 56% of the total 56,128 internal mode students at these universities.

Asian students form the major component of overseas internal mode of attendants in these universities ranging from 97% for Curtin University of Technology to 75% for Griffith University and averaging 88%. The relative proportions of students show that the four main Asian countries are important for the four top rated universities by enrollments. Interestingly a number of universities rely on students from relatively few countries. For example, 39% of all Asian students at Melbourne University and Queensland University of Technology (QUT) are from Singapore. There is considerable variation in the remaining institutions with the Universities of Wollongong and Griffith having “other Asian countries” comprising the majority of students (60% and 65% respectively). This observed bunching of source countries is not unexpected and reflects the marketing strategies of the universities including their establishment of international links and arrangements. A glance at the Indonesian column clearly shows the exposure of universities to the recent Indonesian crises.

Compare this with Table 7's total number of overseas students enrolled as external and multi mode. The five universities with the largest enrollments in these categories have 6,239 students which represent 79% of the total 7,912 enrollments in this classification. The observed higher degree of concentration for this type of enrolment is the main reason only five universities were included here for analysis. Table 7 also shows the relative larger differences between universities, for example Asian students comprise 98% of total students enrolled as external and multi modal at Monash University compared with 56% for Charles Sturt University. The average for this classification is 85%, which is only marginally lower than that for the internal mode of attendance. Again we note the differences in proportions across countries and universities, in particular the heavier reliance of some universities on a few source countries than for the internal mode of attendance.

Table 6: Proportions of Overseas Students in the Top Ten Australian Universities by Internal Mode of Attendance: 1997

	% of Total Asia						% of Total	
University	Malaysia	Singa-pore	Hong Kong	Indon-esia	Other Asian	Total Asia	Non Asian	Total
RMIT	21	40	9	13	18	5,342	4	5,550
Curtin	25	33	22	12	8	4,456	3	4,605
NSW	15	13	20	18	4	3,894	14	4,512
Monash	32	19	16	14	19	4,125	4	4,294
Sydney	17	27	10	5	40	1,978	19	2,445
Melbourne	39	18	11	10	22	1,793	24	2,369
Wollongong	10	5	12	13	60	1,716	20	2,135
QUT	16	39	8	11	27	1,731	11	1,939
Griffith	6	9	10	9	65	1,479	25	1,982
UWS	5	4	26	13	52	1,444	22	1,862
Total	21	24	15	13	28	27,958	12	31,603

Source: Australian International Education Foundation (1998), "Overseas Student Statistics", Table 24, pp. 56-7.

Table 7: Proportions of Overseas Students in the Top Five Australian Universities by External and Multi Modal Attendance: 1997

University	Malaysia	Singa-pore	Hong Kong	Indon-esia	Other Asian	Total Asia	Non Asian	Total
USQ	55	22	15	1	7	2,152	10	2,378
Monash	4	54	40	0	2	1,422	2	1,444
Charles Sturt	23	9	62	1	6	595	44	1,071
Deakin	53	18	11	4	13	785	11	882
UCQ	10	45	19	3	23	359	23	464
Total	34	30	27	1	8	5313	15	6,239

Source: Australian International Education Foundation (1998), "Overseas Student Statistics", Table 25, pp. 58-9.

Charles Sturt and Monash Universities rely heavily on Hong Kong students, Deakin University and the University of Southern Queensland (USQ) rely on Malaysian students whilst Monash University and the University of Central Queensland (USQ) have focussed on students in Singapore.

Given that the Asian region is an immensely important source of these students we would expect Malaysia, Singapore, Hong Kong and Indonesia to be the countries in this region which supply the majority of students studying “Business Administration and Economics” (*vide* Table 8). Enrolments in the Faculty of Commerce at the University of Wollongong for 1997 are included in Table 8 for comparison with the Australian figures. Note that the percentage shares of total BCom enrolments vary considerably with the total Faculty of Commerce enrolments for individual countries. Importantly these shares indicate a lower importance of Malaysia and Singapore and a relatively larger importance of Indonesia, India, China and Taiwan to the Faculty of Commerce. Whilst student enrolments from Singapore averaged a 28 percent annual growth rate for the period 1993-97 the countries of India, China, Taiwan, Japan and South Korea also experienced significant growth in enrolments.

From an educationalist point of view we would expect students from such a wide range of countries to have very different backgrounds in economics education ranging from traditionally planned economies (China) to free enterprise economies (Hong Kong and Taiwan); from large complex economies (India) to city states (Singapore); and from countries with very different institutional characteristics (Thailand, Japan and Indonesia). In addition to this we would expect possible culture based and language difficulties associated with these differences. This finding makes it even more difficult to determine the particular needs of overseas students in economics because of the large variation of the overseas student mix across universities. Consistent with Watson and Barber (1997) it would not be sensible to expect that a common comprehensive remedial solution to these problems confronting all overseas economics students could be easily found. Whilst some generic

needs and competencies can be identified, it appears that individual economics departments need to determine their overseas student needs which may be specific to their particular population characteristics.

Table 8: Proportions of Overseas Students in Higher Education Business Administration and Economics/Commerce by Country: 1997

	Australia (Bus. Admin. and Economics)	University of Wollongong (Commerce)		
		BCom	All Commerce	
Country	% of Total	% of Total	% of Total	% Growth[a] 1993-97
Malaysia	26	14	9	6
Singapore	24	7	4	28
Hong Kong	18	26	18	-1
Indonesia	11	15	15	2
India	4	2	8	13
Thailand	4	2	8	1
China	3	8	10	22
Taiwan	3	10	10	11
Korea (South)	1	2	2	10
Japan	1	4	3	37
Other	5	11	13	2

Note: [a] average annual growth rate for 1993-97.

Sources: Faculty of Commerce, University of Wollongong and Australian International Education Foundation (1998), "Overseas Student Statistics", Table 19, pp. 44.

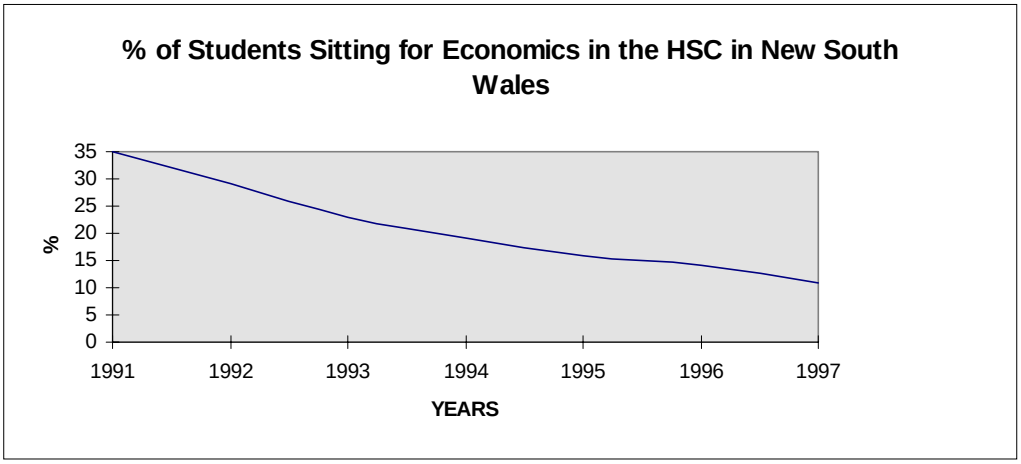
HSC Students:

Unlike the overseas higher education students, the relative importance of the HSC as preparation for university study has diminished. It was explained above that the HSC has declined as a basis of admission for undergraduate commencing students in Business- Economics related fields from 57% of all admitted students in 1989 to 46% in 1997. This effect is only slightly less in New South Wales, declining from 57% of the commencing students to 49%.

It is well documented that this decline is exacerbated by the the fall in the proportion of HSC students studying economics in the 1990's. Figure 3 shows there has been a steady decline in the percentage of students studying economics for the New South Wales Higher School Certificate. The Board of Studies (1998) statistics shows a decline in students sitting for the HSC in economics from 19,708 (35% of the cohort) in 1991 to 6,693 (11%) in 1997. This decline is at least partly the result of an increase in the range and

vocational nature of new subjects introduced to the HSC, such as Business Studies, Legal Studies and Personal Development, Health and Physical Education. At the same time the quality of economics students sitting for the HSC has improved. This is reflected in the rise in the mean scaled mark for Economics rising from 26.0 per unit in 2 unit and 31.6 for 3 unit in 1990 to 28.7 and 34.4 respectively in 1997 (*vide* Table 9).

Figure 3



Source: Board of Studies (1998).

Table 9: Scaled Mean Mark per Unit of HSC Economics

	1990	1991	1992	1993	1994	1995	1996	1997
2 Unit	26.0	26.4	26.9	27.8	28.1	28.2	28.8	28.7
3 Unit	31.6	31.8	31.6	32.3	32.3	32.9	34.0	34.4

Source: The Technical Committee on Scaling, "Report on the Scaling of the NSW Higher School Certificate", various years.

The emerging differences between the relative size and quality of the group of students sitting for the HSC indicate increasing heterogeneity of the first year student cohort. This is a potential source of disadvantage for those with little or no prior economics education, although it could also penalise these better prepared HSC students if economics courses were not structured to satisfy their needs and to keep them interested and challenged.

According to Hodgkinson (1994) and Hodgkinson and Perera (1996), 37% of first year economics students at the University of Wollongong who had prior economics education, considered the subject content to be easier than that of other subjects, whereas the relevant proportion for

those with no prior economics education was significantly lower at 23%. In addition, recent studies show that these first year economics students achieve significantly higher marks than their classmates with no prior economics education. Junor and Matthews (1996) found that first year economics students at Macquarie University in the former category achieved marks that were, on average, 8 percentage points higher than those of their classmates in the latter category. This is confirmed by this year's first semester Macroeconomics results at the University of Wollongong which are summarised in Table 10. The differences in means show that first year students who have studied HSC economics averaged close to 9 percentage points higher than those who have not. There is little observed difference between non HSC students who have studied some economics and those who have not studied economics previously.

Table 10: ECON101 Introductory Macroeconomics Results Session I, 1998

	Prior Economic Study			Total
	HSC ECON101	Some	None	
Distribution Characteristics				
Mean	70.6	60.2	61.3	62.9
Standard Deviation	11.7	11.1	11.4	12.0
Kurtosis	-0.24	2.26	-0.40	0.11
Distribution of Grades	*%*	*%*	*%*	*%*
High Distinction	9	2	5	5
Distinction	36	11	9	15
Credit	27	23	24	25
Pass	27	61	57	52
Fail *	0	2	5	3
Total Students	33	47	79	159

Note: * The fail results are incomplete. Witheld and incomplete results and the supplementary exam will increase the number of declared fails.

The grade distribution highlights some further important characteristics. First, there were five non HSC students, who obtained a high distinction, compared with three HSC students. It would appear that not having studied HSC economics does not bar students from achieving a high distinction standard. Secondly the HSC students have a much larger proportion of distinctions (36%) than the other students combined (10%) and a lower proportion of passes (27%) which is half of that for the non HSC students (59%). Third, the HSC student's results are bunched in the distinction range, demonstrating the relatively high overall ability of the group.

TAFE and Special Entry Students:

It is also impossible to determine from the results in Table 10 the relative performance of students with TAFE backgrounds and other special entry students. These students have grown in importance in the student population as shown in Table 1. In NSW the proportion of TAFE students entering the undergraduate Business-Economics field of study has risen from 6% in 1989 to 12% in 1997. The growth rate of these students averaged 26% per annum for the period 1989 to 1997. This was consistent with the fall in the relative share of HSC students for NSW over the same period.

According to Lewis (1997) the universities were facing falling demand and the need to achieve government designated enrolment targets during this period. In order to increase enrolments without reducing the TER cut off significantly, the universities may well have filled the shortfall with TAFE and other special entrants. Lewis also argues that in 1996 these TAFE graduates had a 47% chance of being offered their first university preference compared to HSC students of 45%. When all six preferences were included, the likelihood for TAFE graduates to be successful increased to 75%, whilst that for HSC students only increased to 69%. Additionally, there is the increasing trend for students to attend TAFE instead of attempting years 11 and 12 at secondary school, in order to more successfully adjust to university studies and as a result of the greater flexibility of TAFE.

In terms of performance, Cohen and Stone (1997, p.25) quote research by Lewis who found that TAFE students admitted to the University of Wollongong "performed on par with the general population of students". However Cohen and Stone (1997, p.25) also question the TAFE students competencies in mathematics and raise the general issue of the "changing composition of the student intake and the need to cater to diverse student needs".

Characteristics of Students Studying Macroeconomics Theory and Policy - ECON205, at the University of Wollongong in 1998.

The subject had 104 students enrolled at the time of the initial survey. From the sample of students, 39% were born in Australia, 53% were born in South East Asia and 8% were born elsewhere overseas. The proportions for the student's country of residence were very close to the country of birth values. In terms of students backgrounds 28% had not studied economics prior to starting university. For the students who had studied economics previously, 39% had studied Year 11 or 12 economics at secondary school, 11% had studied economics at either TAFE, Foundations studies or elsewhere in Australia, whilst a large 51% had studied economics overseas. Table 11 shows the first year macroeconomic grades of these categories of students. Clearly, the HSC students coming into ECON205 are better prepared than all the others, whilst students with 'other Australian' and overseas prior economics performed relatively poorly. Students who had not studied economics previously formed an interesting bimodal distribution suggesting

that a proportion of these students have achieved a distinction grade whilst the other major grouping have obtained a pass grade.

Table 11: Percent Distributions of ECON205 Students First Year Macro Grades by Prior University Economics Background

Grade	None	HSC	Other Australia	Overseas	All Students
Fail	0	0	0	0	0
Pass Conceded	9	3	0	0	4
Pass	41	10	44	41	31
Credit	14	52	22	36	34
Distinction	27	28	22	14	23
High Distinction	9	7	11	9	9

The questionnaire also requested student's feedback on their preferred learning styles. To this end we used Flemming's (1995) approach to determine students preferred modes of intaking, processing and outputting information as applied by St Hill (1997). This approach is called VARK because of the four modes:

V Preference for visual ways of representing information, for example video, graphic and symbolic ways
A Preference for learning by aural methods, for example by listening and talking
R Preference for reading and writing textual information
K Preference for kinesthetic learning experiences and practices.

Students were asked to respond to each of the thirteen questions by nominating any one or more of the above modes as appropriate for them. The average number of responses for each mode were 3.7 for *V*, 3.5 for *A*, 5.0 for *R* and 4.0 for *K*. Whilst textual preference was ranked the highest, the other modes were also significant, implying that visual, audio and kinesthetic are important modes of processing information by these students. A few examples show the variability of student preferences. For some, only one mode dominated (V,A,R,K = 3,8,0,2 for a HSC student who got 66% on the mid-session test whilst another HSC student who got 60% scored 9,3,2,6 and another overseas student who got 84% scored 4,3,8,4). Others scored low in all modes (3,2,2,4 for a student with no prior economics and who got 70% on the mid-session test and another overseas student who got 42% scored 6,8,6,7). We interpret these findings of heterogeneous preferences as further evidence of a need for computer based learning which includes multimedia in a meaningful fashion.

The Need for Computer Based Learning in Economics:

Due to the identified increasing heterogeneity of students' prior economics backgrounds and knowledge, it became apparent that these

students require more flexibility in the learning process. They need to have a choice of alternative pathways according to their prior knowledge, current interests, expertise and preferences which will facilitate improved learning outcomes and more efficient progression into third and Honours years, regardless of their backgrounds. The provision of flexible learning which provides a logical and consistent sequence is vital, but difficult to achieve in practice. Accordingly the authors proposed to develop relevant computer based learning (CBL) that would specifically cater to different learning backgrounds.

The survey of economics students, at the University of Wollongong, by Hodgkinson and Perera (1996) also found that students requested more computing in the economics units. Indeed the demand is large and unmet in this area. Burley (1993) was able to record first year quantitative economics students usage of computerised multiple choice questions on a VAX computer at Latrobe University. In one semester approximately 550 students had 3,850 individual unsupervised sessions outside of class time with each student averaging seven sessions of 23 minutes average duration. A survey of Australian first year economics courses by Kniest, Lee and Burgess (1993) found that none of the 20 respondents included computer laboratory sessions in their 36 first year economics subjects.

Siegfried and Round's (1994) survey of Australian economic undergraduates found that students selected economics to gain practical knowledge for decision making. Consistent with the University of Wollongong's 'Employer Perception Surveys' (1992-94), Abelson and Valentine (1985) found that Australian employers of economists consider the ability to interpret and analyse economic developments as most important. If these findings can be interpreted as students and employers wanting the curriculum to include problem solving then an experiential, problem based learning environment is appropriate (*vide:* Dabb, Jones and Perry (1996) and Goldring, Lamb and Tapsell (1996)).

Interactive computer assisted learning modules, customised to meet student characteristics and appropriately designed to provide timely and constructive feedback, allow students to progress according to their individual interests, needs and abilities at their own pace. For example, students may progress more quickly to the next topic, backtrack to previous material, select a relevant remedial tutorial, look up a glossary of terms and definitions, branch to an example or select an option for additional or advanced material by "pointing and clicking" in a Windows environment.

Appropriately designed CBL can facilitate "deeper learning" in terms of problem solving experiential learning. Unlike a lot of CBL projects, where technology drives the approach instead of learning objectives and relevant curriculum development (*vide* McKendree, 1994), the learning environment needs to actively involve the student. Noting Wills (1994) point that interaction does not necessarily ensure student engagement,

the CBL package needs to incorporate these important characteristics if it is to achieve its purpose.

Development Details

The development of a sophisticated computer assisted learning software package takes many thousands of hours over many years. We believed it was far more cost effective to modify and further develop the internationally acclaimed WinEcon interactive CBL package.

WinEcon:

The Economics Consortium based at the University of Bristol launched WinEcon in the UK in September 1995 after three years of development. The Consortium, which includes the Economics Departments at the Universities of Coventry, Leicester, London Guildhall, Oxford, Portsmouth, Staffordshire and Surrey was funded for £640,000. This was part of the UK Higher Education Funding Councils' grant of £35 million in the early 1990's to 76 Teaching and Learning Technology Program (TLTP) consortia to develop discipline based computer learning materials.

WinEcon won a medal for excellence in design and innovation at the British Computer Society Awards in 1995 (competing against non educational, private sector projects) and has won prizes at the 1996 European Academic Software Awards and the US Asymmetric Interactive Multimedia Awards. The Consortium is supported by The Royal Economic Society and an earlier version of the WinEcon package has been reviewed by Sloman (1995). Currently, 85% of all UK university economics departments use the package and internationally, WinEcon is used at more than 250 sites worldwide, including a recently released version for the USA. The Consortium has just received additional funding of £300,000 for the subsequent second stage development of a Web version of WinEcon which will be extended to include a business economics component and case studies.

The Department of Economics at the University of Wollongong has been an associate member of the TLTP Economics Consortium since 1993 and is presently negotiating to become a full member. The Director of the WinEcon project, Phil Hobbs based at the University of Bristol, has visited the University of Wollongong in 1993 and 1997, and Senior Lecturer in Economics, Ed Wilson, has met with him in London in 1994. The Department has reviewed and tested trial versions of WinEcon in the first year macroeconomics subject ECON101 taught in summer sessions during 1993-95. Li Lin Cheah, the former Project Manager of the US WinEcon project in 1997 and Manager of Learning Research Software Development at the University of Bristol, is a Visiting Fellow in the Department of Economics at the University of Wollongong, from April

to October 1998. A group of members of the Department of Economics are planning an Australasian version of WinEcon, which will be developed in two stages. The first involves the adaptation of the macroeconomic chapters of WinEcon, which will be called 'MacroWinEcon for Australasia'. This project is currently a 1998 CUTSD application. Upon successful completion of the first stage a microeconomic adaptation is planned.

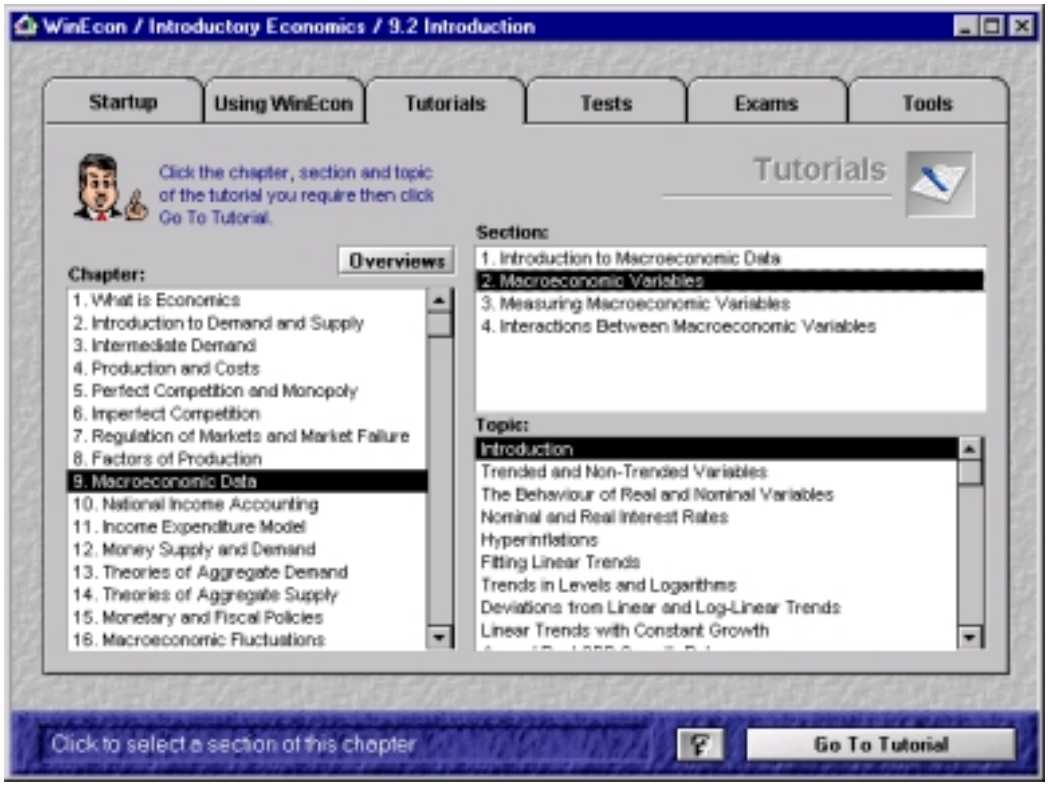
WinEcon is the only available comprehensive computer learning software package for a full first year undergraduate economics course. The Windows based "point and click" interface package is highly interactive, interesting and pedagogically flexible. Sloman's, (1995, p. 1330) review in the Economic Journal gives the examples of "selecting the right answer from alternatives; plotting graphs; clicking on lines from a graph and dragging them to an equilibrium point; matching labels to curves; animating diagrams; clicking on buttons to reveal more information; moving sliders to show the effects of changing variables; typing in an answer; initiating simulations; and sorting groups. This interaction clearly reinforces learning and tests understanding". The package also includes a network of materials including self assessment questions and exams, over 75 hours of tutorial material and economic databases, glossary and economic textbook references. According to MacDonald and Soper (1993), Soper and MacDonald (1994) and Sloman (1995), WinEcon can be used as a personal experiential learning tool facilitating deeper learning.

Evidence of the thorough evaluation of learning outcomes through student use of WinEcon is included in Soper (1997). Crighton and Judge (1996) have collected and analysed quantitative data, which shows that students who used WinEcon had higher scores than others both in coursework and in the examination. A controlled experiment at the University of Leicester divided students according to their economics and mathematics backgrounds and randomly allocated them to tutorial groups, some of which were directed to use WinEcon using prepared WinEcon problem sheets. The results reported in MacDonald and Shields (1996), show that these students had improved examination performance whilst students who had undirected use of WinEcon, did not. Clarke and Clarke (1996) and Allen *et al* (1996) have also published WinEcon evaluations of selected representative groups of students at the Universities of Stirling and Humberside (which are not members of the WinEcon TLTP Economics Consortium) and found evidence supporting WinEcon enhancing the learning process.

WinEcon Fiscal Pathways Package:

This package was developed by the authors during 1998 and differs significantly from WinEcon in five important ways:

1 As explained in the above section on the Educational Rational, this package includes a new and innovative alternate learning pathways. An example of this was shown on page 4 above. Contrast this with the traditional index approach of WinEcon.



2 WinEcon is overall a very large fully comprehensive first year economics course. Only parts relevant to the learning goals of this project were selected to be used in Winecon FP. They came from Chapters 1, 9, 11, 13, 14, 15, 17 and 25, and these components have been modified and sequenced in very different orders as required. It is anticipated other modules will be developed in time. The next two developments will focus on monetary policy and the flexible price aggregate demand and supply model.

3 According to student preferences detailed in their VARK survey results (*vide* St Hill (1997) and Flemming (1995)) there is a clear need for the inclusion of video and sound. It was believed that this was most important in the navigation area where the introductions and summaries of each stage would be helpful to students.

4 This package incorporates links with assigned exercises to the Web pages of the ECON205 course and national and international institutions. This adds to the integration of this package to the course and makes it a more relevant and effective learning aid. An example was included on page 7 above.

5 The package was modified by changes to language, conventions and examples to make it more relevant to students from the Australasian region.

WinEcon Fiscal Pathways was developed by the authors of this document. The package uses Asymetrics Toolbook authoring system which can be used on a Windows based PC.

Evaluation of Effectiveness

The package has being used in the second year subject ECON205 Macroeconomic Theory and Policy. It generally requires about 12 hours of teaching time to work through the package. While the exposure to WinEcon Fiscal Pathways has been limited, we have survey data and progressive assessment results that demonstrate the success of the WinEcon FP package.

Survey results:

A survey was conducted in week ten of the semester (see attachment). 79% of the students said their interest in computer based learning had increased since using the package, whilst 20% had not changed their interest and one student's had fallen. Only 4% of students thought the program was useless or distracting, 17% had no feelings, 61% and 17% respectively thought the program was a helpful or very helpful learning aid. When asked how the program has affected students understanding of the material, 82% said it had been helpful, 7% believed it was very helpful, whilst 10% experienced no change. Students believed the program's navigation aids were helpful or very helpful (60% and 14% respectively) with 14% having no feelings.

When WinEcon Fiscal Pathways was compared to the original WinEcon package, one student thought it was worse, 28% of students had no feelings, yet 60% believed it was better and 8% thought it a lot better. We expect these views reflect *inter alia*, our attempts to help students navigate their way through the program; to integrate the package into the course; and to provide alternative learning modes according to the students VARK responses.

Test results:

Students have been given two tutorial surprise tests worth 5% each and a mid-semester test worth 20%. The first surprise test and the mid session test were conducted prior to the students being introduced to the package. The second surprise test was given to the majority of students after they had been exposed to the package in formal laboratory sessions. One tutorial was treated as a control group by having normal tutorials and not being given any access to the package during this time. The second test consisted of eight multiple choice questions which were selected from the mid-session test and which had an average mark of 60%, which compares with the mid-session test average mark of 60.5%. Students answered the mid-session test on the test paper which was collected at the end of the exam period and not returned or solutions given. The selected questions and distractors were re-ordered and the wording was modified where appropriate.

The results for the non control group improved from the mid-session test average of 60.4% for this group to an average of 69.5% for the second surprise test. This increase of just over 9 percentage points was achieved despite the surprise element of the second test! In comparison, the average mark for the control group of sixteen students who were given the alternative standard tutorials, denied access to the package and who sat the same tests as the non control group, fell from 60.8% for the mid-session test to an average of 45.0% for the second surprise test. These results support and are consistent with the favorable survey evaluations by students reported above which say that the

majority of students found the package to be a helpful learning aid which increased their understanding of the material.

We believe a computer based learning system that allows greater flexibility in student learning does promote increased interest in and understanding of the subject matter. It is important for economics educators to realise that students do have different interests, backgrounds and preferred styles of learning and that we structure courses and teaching methods that cater for these.

References

ASCILITE (1998), 'The 1998 ASCILITE Awards', [http://www.ascilite.org.au/awards98.html].

Abelson, P. and T. Valentine (1985), 'The Market for Economists in Australia', *Economic Papers*, 4, pp. 1-16.

Allen, P., Booth, S., Crompton, P. and Timms, D. (1996), 'An Evaluation of the WinEcon Software in Case Studies: Integrating Learning with Technology'. *TLTP Project Varsetile*, University of Stirling, pp. 51-66.

Australian Graduate Careers Council (1990-94), 'Graduate Destination Surveys', various issues.

Australian International Education Foundation (1998), "Overseas Student Statistics: 1997", Department of Employment, Education, Training and Youth Affairs, Commonwealth Government of Australia, Canberra.

Becker, W. (1997), 'Economics, Education and Economists: A View From the United States', *Australian Economic Papers: Special Issue Australian Economics Education*, September, pp. 5-16.

Becker, W. and M. Watts (1995), 'Teaching Methods in Undergraduate Economics'. A paper given at the *Australian Economics Education Symposium*.

Becker, W., W. Walstad and M. Watts (1994), 'A Comparison of the Views of Economists, Economic Educators, Teachers and Journalists on Economic Issues', in W. Walstad (ed.) *An International Perspective on Economic Education*, Luwer Academic Publishers, Boston, pp. 65-87.

Blinder, A.S. (1991), 'Research in Economic Education and the Teaching in Economics', *Journal of Economic Education*, pp. 251-54.

Board of Studies (NSW) (1995), *Key Competencies Mapping Report.*

Board of Studies (NSW) (1998), *Examination Statistics HSC.*

Burley, W. (1993), 'VAX Interactive Tutorials in Quantitative Economics', *Computers in Higher Education Economics Review*, 18, pp. 15-18.

Carmichael, L. (1992), 'The Australian Vocational Certificate Training System'. A Report to the National Board of Employment, Education and Training and Skills Foundation Council, Commonwealth Government of Australia, Canberra.

Clarke, P. and Clarke, K. (1996), 'Computer Assisted Learning in Economics - WinEcon Trial at the University of Humberside - Academic Year 1994-95. *Economics & Business Education*, 4, pp. 23-27.

Cohen, R. and J. Stone (1997), 'University Admissions Procedures for NSW TAFE Graduates', *Evaluations and Investigations Program, 97/14*, Department of Employment, Education, Training and Youth Affairs, Commonwealth Government of Australia, Canberra, September.

Committee for the Advancement of University Teaching, (CUTSD) (1997), 'Guidelines National Teaching Development Grants - Individual', Department of Employment, Education, Training and Youth Affairs, Commonwealth Government of Australia, Canberra.

Cowie, J. *et.al* (1994), 'Bodies and Minds', paper presented at a *Seminar in Teaching First Year Economics*, given at University of Canberra.

Cowie, J. *et.al* (1995), 'Testing Teaching Change in Economics', Draft Report, University of Adelaide.

Crighton, P. and Judge, G. (1996), 'The WinEcon Evaluation Project', in P. Hobbs (Ed.), *CALECO95 Conference Proceedings*, Centre for Computing in the Social Sciences, University of Bristol, pp. 43-50.

Dabb, H., Jones, B. and G. Perry (1996), 'New Perspectives in the Delivery of Economics: Integration as a Method for Teaching Introductory Economics'. Paper presented at the *1996 Winter Conference of the New Zealand Association of Economists*, August 25-28, University of Auckland.

Feast, V., McBride, G., Sharp, R. and P. Statton (1997), 'Teaching Matters!: Further Evidence in the Economics Education Debate', *Australian Economic Papers*: *Australian Economics Education Special Issue*, September, pp. 81-93.

Emslie, M. (1996), 'Virtual Economics CD-Rom', *The Economic Journal*, 106, pp. 1450-1457.

Finn, B. (1991), 'Young People's Participation in Post Compulsory Education in Training', Report to the Australian Education Council Review Committee.

Flemming, N. (1995), 'I'm Different Not Dumb: Modes of Presentation (VARK) in the Tertiary Classroom', presented at the Annual Conference of the Higher Education Research and Development Society of Australasia, Rockhampton, July.

Goldring, J., Lamb, A. and L. Tapsell (1996), 'Learning by Doing—Problem based and Experiential Learning Workshop', *University of Wollongong Overview*, 3, pp. 25-27.

Hodgkinson, A. (1994), 'A Survey of First Year Economics Students', Department of Economics, University of Wollongong, mimeo.

Hodgkinson, A. and N. Perera (1996), 'Why aren't they Taking Economics? Attitude of First Year Students - University of Wollongong - Case Study', *Department of Economics Working Paper Series WP/96-13*, University of Wollongong.

Industry Commission (1997), 'Industry Submission to the Review of Higher Education Financing and Policy', Industry Commission, Canberra, July.

Junor, B. and K. Matthews (1996), 'HSC Economics and University Economics: How Do Students Benefit?, presented at the *4th Annual Teaching Economics Conference*, Northern Territory University.

Kniest, P., Lee, J. and J. Burgess (1993), 'First Year Economics Courses at Australian Universities: A Survey'. Paper presented at the *1993 Conference of Economists*.

Krueger, A.E. *et.al* (1991), 'Report on the Commission on Graduate Education in Economics', *Journal of Economic Literature*, pp. 1035-53.

Lewis, D. (1997), 'Admission Outcomes for NSW TAFE Graduates Who Apply to University: Evidence from NSW and ACT Universities, 1991-96', *Evaluations and Investigations Program, 97/14*, Department of Employment, Education, Training and Youth Affairs, Commonwealth Government of Australia, Canberra, September.

Lewis, R. and K. Norris (1996), 'Recent Changes in Economics Enrolments', presented to the *25th Conference of the Economics Society of Australia*, Australian National University.

McBride, G. *et.al* (1994), 'A Small Group Problem Based Approach to Teaching Economics', presented at *Teaching First Year Economics Seminar*, University of Canberra.

MacDonald, Z. and Shields, M. (1996), 'Effective Computer-Based Learning of Introductory Economics - Some Results from an Evaluation of the WinEcon Package', Discussion Paper in Economics No. 96/11, University of Leicester.

MacDonald, A. and Soper, J. (1993), 'Interactive Learning with WinEcon', *Computers in Higher Education Economics Review*, 20.

McKendree, J. (1994), 'Who is the Audience? Design versus Modifiability', *UK Teaching and Learning Technology Program*, July, pp. 6-7.

Mayer Committee (1992), 'Employment—Related Key Competencies: A Proposal for Consultation', Melbourne.

Neri, F. (1998), 'The Simultaneity of Walking and Crawling: Introducing First Year Students to the Professional Literature', paper presented to the Sixth Annual Teaching Economics Conference, Macquarie University, 16-17 July.

Pascoe, R., McClelland, A. and B. Mcgraw (1997), 'Perspectives on Selection Methods for Entry into Higher Education in Australia', National Board of Employment, Education and Training, *Commissioned Report No. 58*, Commonwealth Government of Australia, Canberra, December.

Ryan, M., Wells, J., Freeman, A. and Hallam, G. (1996), 'Resource-based Learning Strategies: Implications for Students and Institutions', *Alt-J*, 4 (1), pp. 93-98.

St Hill, R. (1997), 'Modal Preferences in Teaching and Learning Economics', *Proceedings of the Fifth Annual Teaching Economics Conference*, University of Southern Queensland, Toowoomba, 2-4 July, pp. 53-79.

Savage, E. (1994), 'Innovation in the Teaching of Undergraduate Economics', presented at *Teaching First Year Economics Seminar*, University of Canberra.

Siegfried, J. and C. Scott (1994), 'Recent Trends in Undergraduate Economics Degrees', *Journal of Economic Education*, pp. 281-86.

Siegfried, J. and D. Round (1994), 'The Australian Undergraduate Economics Degree: Results from a Survey of Students', *The Economic Record*, 70, pp. 192-203.

Siegfried, J. and G. Sweeney (1997), 'Designing Economics Education Experiments', *Australian Economic Papers: Special Issue Australian Economics Education*, September, pp. 38-45.

Sloman, J. (1995), 'WinEcon', *The Economic Journal*, 105, pp. 1327-1346.

Soper, J. (1997), 'Integrating Interactive Media in Courses: The WinEcon Software with Workbook Approach', *Journal of Interactive Media in Education*, 97 (2), [www-jime.open.ac.uk/97/2], pp. 15.

Soper, J. and MacDonald, A. (1994), 'An Interactive Approach to Learning Economics: The WinEcon Package', *Journal of the Association of Learning Technology*, 2.

Stokes, A. and E. Wilson (1998a), 'Catering for First Year Economics Students Heterogeneous Needs and Prior Economics Backgrounds: An Application of CBL at the University of Wollongong', presented at the Sixth Annual Teaching Economics Conference, Macquarie University, 16-17 July.

Stokes, A. and E. Wilson (1998b), 'Catering to Individual Introductory Macroeconomics Students Needs: Streaming Students Based on Their Prior Learning Backgrounds', presented at the 27th Conference of Economists, University of Sydney, 28 September - 1 October.

Stratten, P. and G. McBride (1995), 'What Should We Teach in an Economics Foundation Studies?', presented at the *Australian Education Symposium*.

Technical Committee on Scaling, 'Report on the Scaling of the NSW Higher School Certificate', *New South Wales Vice-Chancellors Conference*.

University of Wollongong (1992-94), 'Employer Perception Surveys'.

University of Wollongong (1994), 'Towards 2000: First Year Progress Report'.

University of Wollongong (1997), 'Attributes of a Wollongong Graduate', *Strategic Plan – 1997 – 2005*.

Watson, J. and Barber, T. (1997), 'Overseas and Migrant Students in Economics: Are We Addressing Their Needs?', *Australian Economic Papers: Special Issue Australian Economics Education*, September, pp. 94-99.

Wills, S. (1994), 'Beyond Browsing: Making Interactive Multimedia Interactive', *Educational Technology Conference Proceedings*, 30-31 May, pp. 58-68.

ECON205 Macroeconomic Theory and Policy
Questionnaire - Spring Session, 1998

1. My gender and age are: Female ○ Male ○ _____ Years

2. I am enrolled as: Full Time ○ Part Time ○

3. My country of birth is: _____

4. I have lived most of my life in: _____

5. I studied economics before university: Yes ○ (go to next Quest.) No ○ (go to Q.7)

6 If you answered Yes to Question 5

Did you study economics at?:

- School in Australia (Year 11) ○
- School in Australia (Year 12) ○
- TAFE in Australia ○
- Foundation Studies in Australia ○
- Other in Australia ○
- Overseas ○

7 My grade for ECON101 was:

Fail	Pass Conceded	Pass	Credit	Distinction	HD
○	○	○	○	○	○

8. Did you study ECON101 in first Session <u>THIS</u> year? Yes ○ No ○
If Yes were you in Stream? N ○ S ○ H ○

9 How would you rate your economics knowledge and analytic skills?

Very Weak	Weak	Satisfactory	Good	Very Good
○	○	○	○	○

10 Your feelings about studying economics is best described by?

Hate It	Boring	No Feelings	Interesting	Very Interesting
○	○	○	○	○

11 How would you rate your mathematics knowledge and skills?

Very Weak	Weak	Satisfactory	Good	Very Good
○	○	○	○	○

13. Have you used computer based learning before? Yes ○ No ○

14. How would you best describe Computer Based Learning?

Useless	Distracting	Fun	Useful	Very Useful
○	○	○	○	○

15. Do you have a computer at home? Yes ○ No ○
If Yes do you have WWW access? Yes ○ No ○

16. My in-course test result for this subject is: _____%

17. My VARK results are:
V = _____
A = _____
R = _____

K = _____

ECON205 Macroeconomic Theory and Policy

Second Questionnaire
Week 10, 1998

1. My gender is: Female ○ Male ○

2. I am enrolled as: Full Time ○ Part Time ○

3. I studied economics before university: Yes ○ (go to next Quest.) No ○ (go to Quest.5)

4. If you answered Yes to Question 3

   Did you study economics at?:
   - School in Australia ○
   - TAFE in Australia ○
   - Foundation Studies in Australia ○
   - Other in Australia ○
   - Overseas ○

5. You would best describe Computer Based Learning <u>before</u> using WinEcon as:

Useless	Distracting	No Experience	Useful	Very Useful
○	○	○	○	○

6. Your interest in Computer Based Learning <u>since</u> using WinEcon has:

Decreased a Lot	Decreased Some	Not Changed	Increased Some	Increased a Lot
○	○	○	○	○

7. How would you best describe WinEcon as a learning aid?

Useless	Distracting	No Feelings	Helpful	Very Helpful
○	○	○	○	○

8. Using WinEcon has caused your understanding of this material to:

Decrease a Lot	Decrease Some	No Change	Increase Some	Increase a Lot
○	○	○	○	○

9. The navigation aids in the new WinEcon Fiscal Pathways program is:

Useless	Distracting	No Feelings	Helpful	Very Helpful
○	○	○	○	○

10. The layout of the new WinEcon Fiscal Pathways program, when compared to WinEcon is:

Lot Worse	Worse	No Feelings	Better	Lot Better
○	○	○	○	○

11. My in-course test result for this subject is: _____%